

LRO and the Planetary Data System (PDS)

Keith Bennett

Deputy Manager for Operations

NASA's Planetary Data Systems' Geosciences Node

Washington University in St. Louis

bennett@wustl.edu

3/14

Agenda

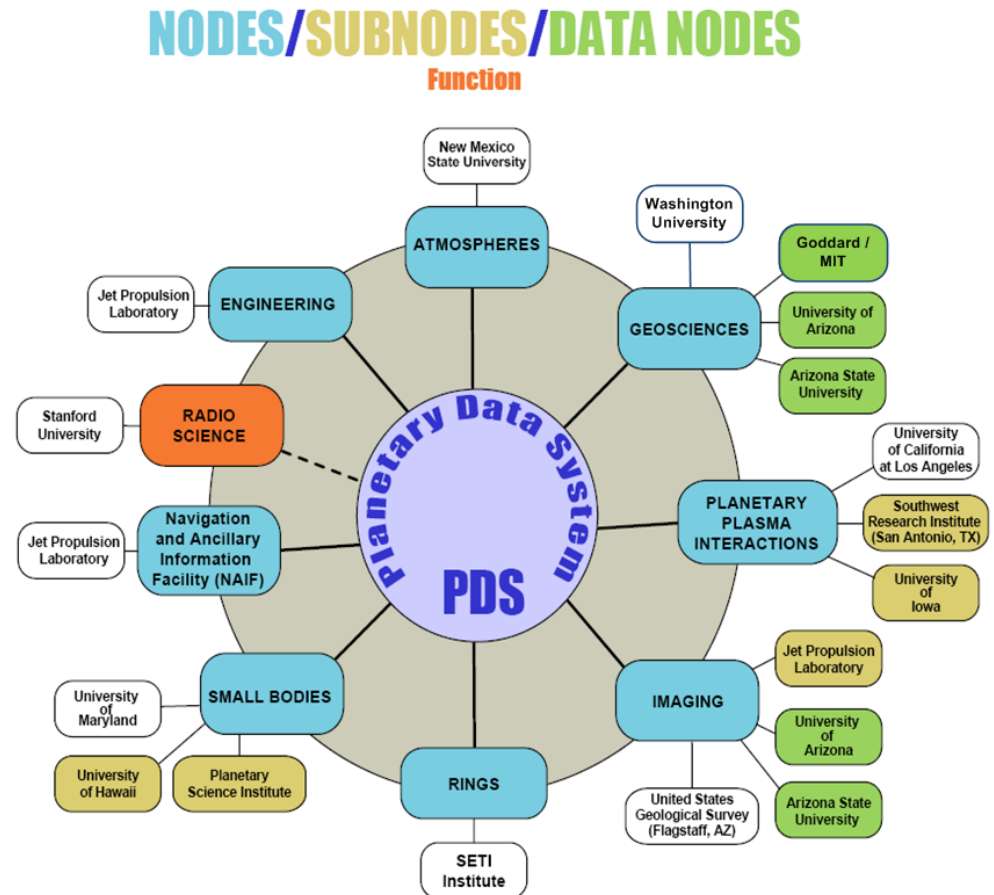
- ❑ Introduction to the Planetary Data System (PDS)
- ❑ Introduction to PDS Volumes, Products, and Labels
- ❑ Discussion on how to find and acquire LRO data from the PDS

What is the Planetary Data System?

- ❑ The Planetary Data System (PDS) is a NASA organization that archives science data from NASA's planetary missions.
- ❑ PDS responsibilities are:
 - To help NASA missions and other data providers to organize and document their digital planetary data,
 - To collect complete, well-documented planetary data into archives that are peer-reviewed,
 - To make the planetary data available and useful to the science community,
 - To ensure the long-term preservation and usability of the data.
- ❑ PDS consists of a set of discipline nodes

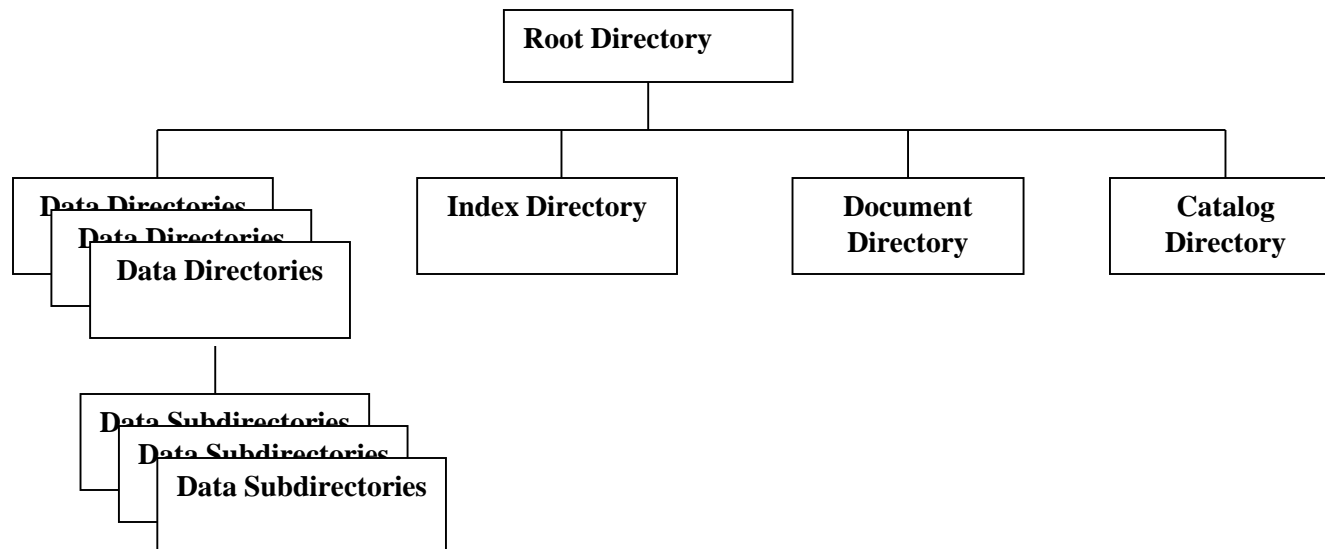
PDS Nodes

- PDS is a distributed organization and system.
- The Geosciences Node is one of the nine Discipline and Support Nodes of the PDS.
- Additional Data Nodes support specific data sets



Data Archives

- A data set is a collection of similar data products with supporting information.
 - For example, data from one instrument with same level of processing.
- Archives include supporting information
 - Documentation, calibration data, software, browse images, etc.
- PDS data sets are organized using a standard structure.



PDS Labels Overview

- ❑ Each PDS data product has an associated PDS label.
- ❑ PDS labels contain metadata (data about data) needed to understand and use data products.
- ❑ Labels describe the format and content of the file and data within the file.
- ❑ Labels consist of label statements in the form of keyword=value. They are ASCII text.
- ❑ PDS uses a data dictionary to provide standards for use of keywords and their values.

PDS Label Example

```
PDS_VERSION_ID      = "PDS3"
RECORD_TYPE         = FIXED_LENGTH
RECORD_BYTES        = 44
FILE_RECORDS        = 2556

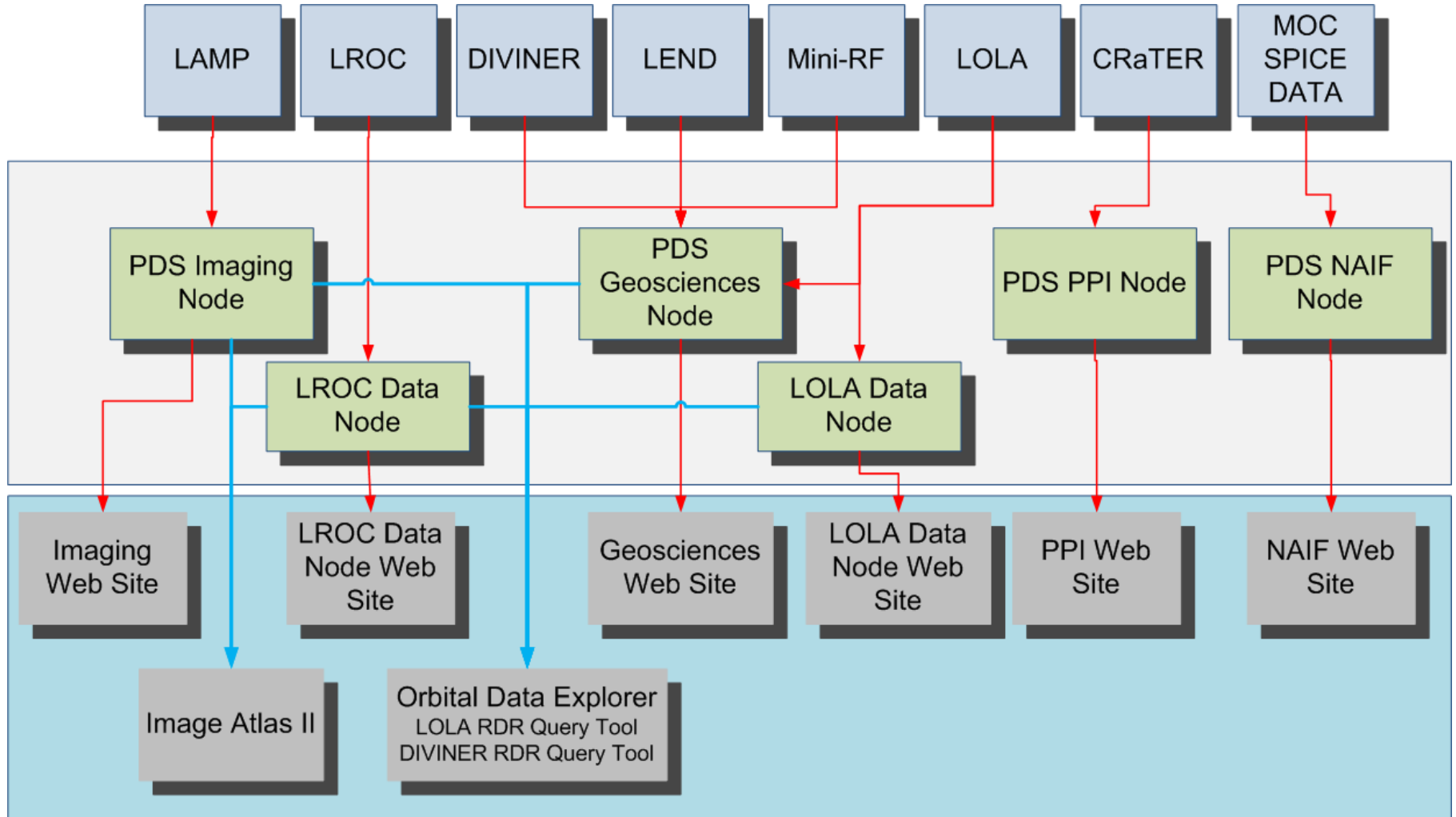
^TABLE              = "GLTM2BSH.TAB"
SPACECRAFT_NAME     = "CLEMENTINE 1"
TARGET_NAME         = "MOON"
INSTRUMENT_NAME     = "LIDAR"
DATA_SET_ID         = "CLEM1-L-LIDAR-5-TOPO-V1.0"
PRODUCT_ID          = "GLTM2B-SH"
PRODUCT_RELEASE_DATE = 1996-01-01
DESCRIPTION          = ""

OBJECT              = TABLE
  ROWS              = 2556
  COLUMNS           = 4
  ROW_BYTES         = 44
  INTERCHANGE_FORMAT = ASCII
  DESCRIPTION        = ""
```

```
OBJECT              = COLUMN
  NAME              = "COEFFICIENT DEGREE"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 1
  BYTES             = 2
  FORMAT            = "I2"
  UNIT              = "N/A"
  DESCRIPTION       = "The degree index m of the C and S
                      coefficients in this record."
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "COEFFICIENT ORDER"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 4
  BYTES             = 3
  FORMAT            = "I3"
  UNIT              = "N/A"
  DESCRIPTION       = "The order index n of the C and S
                      coefficients in this record."
END_OBJECT          = COLUMN
END_OBJECT          = TABLE
END
```

LRO Data Flow



PDS Tools Relevant to LRO

□ PDS Web Sites

- Geosciences (DIVINER, LEND, LOLA, MINI-RF)
- LOLA Data Node (via ODE)
- Imaging (LAMP, LROC)
- LROC Data Node
- PPI (CRaTER)
- NAIF (SPICE Kernels)

□ PDS Tools

- Planetary Image Atlas (LAMP, LROC)
- ODE (DIVINER, LEND, LOLA, MINI-RF, LAMP, LROC)
 - ODE LOLA RDR Query Tool
 - ODE DIVINER RDR Query Tool
- LOLA and LROC Data Node Web Sites/Tools

PDS Web Sites



- Geosciences - <http://geo.pds.nasa.gov/>
 - DIVINER, LEND, Mini-RF
 - LOLA Data Node – <http://imbrium.mit.edu/>
 - LOLA, Radio Science (LOLA Data Node)
- Imaging - <http://img.pds.nasa.gov/>
 - LAMP
 - LROC Data Node - <http://lroc.sese.asu.edu/>
- PPI - <http://ppi.pds.nasa.gov/>
 - CRaTER
- NAIF - <http://naif.jpl.nasa.gov/naif/>
 - SPICE Data
- PDS - <http://pds.jpl.nasa.gov/>

PDS Imaging Planetary Image Atlas

□ LAMP

□ LROC


□ Image

<http://pds-imaging.jpl.nasa.gov/search/search.html>

- Search
- Browse
- Download

The screenshot displays the NASA Planetary Image Atlas search interface. The top navigation bar includes links for NEW SEARCH, MULTI MISSION SEARCH, DATA PORTAL, ABOUT, HELP, FEEDBACK, and HOME. The main search area features a 'Select Mission(s)' dropdown, a 'Select Instrument(s)' dropdown, and a 'Product Search' section. The 'Advanced Search Related to Geometry' section includes fields for Center Latitude, Center Longitude, Lower Left Latitude, Lower Left Longitude, Lower Right Latitude, Lower Right Longitude, North Azimuth, Resolution, and Scaled Pixel Height. The 'Records Found: 1954' section shows current constraints: PRODUCT_TYPE = RDR, TARGET_NAME = MOON, CENTER_LATITUDE >= 35.0, CENTER_LATITUDE <= 40.0, CENTER_LONGITUDE >= 45.0, and CENTER_LONGITUDE <= 50.0. The 'Sample Atlas Image' section shows a small thumbnail of the Earth. The 'Results' section displays a table with columns for Select, Item #, and Thumbnail (Click to View Browse Image). The table lists 28 items, with item 18 selected. A large image of the Moon is shown on the right side of the interface.

Orbital Data Explorer (ODE)



Lunar Orbital Data Explorer
PDS Geosciences Node
Washington University in St. Louis

Home Data Product Search Tools Data Set Browser Download Help & Resources

DATA PRODUCT SEARCH

Planetary science data stored in PDS is organized by [data products](#) and [data sets](#). A data set is a collection of related data products, usually products acquired by a particular instrument and processed in a certain way. The data set also includes all documentation and supporting materials needed to understand and use the data products. A data product is a set of measurements resulting from a science observation, usually products acquired by a particular instrument and processed in a certain way.

STEP 1. SELECT DATA SETS TO SEARCH (A SELECTION IS REQUIRED)

☒ Select One or More Desired Data Sets (Show Options - 1 Parameter Set)

STEP 2. SET ADDITIONAL FILTERING PARAMETERS (OPTIONAL)

☒ Select a Product ID or filter by a partial Product ID (Show Options - 0 Parameters Set)

☒ Find by Product Center Latitude / Longitude (Show Options - 0 Parameters Set)

☒ Filter by Time Range (Show Options - 0 Parameters Set)

STEP 3. PREVIEW SEARCH RESULTS SUMMARY (OPTIONAL)

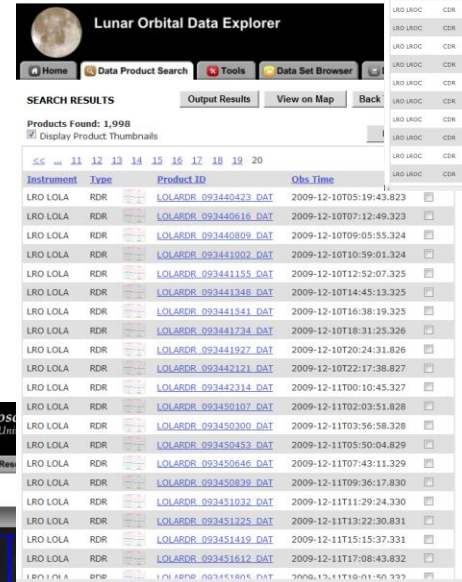
[Preview Search Results Summary](#)

STEP 4. SUBMIT QUERY

[View Results in Table](#) [View Results on Map](#)

☒ Display Product Thumbnails on search results page

SEARCH for Products



Lunar Orbital Data Explorer
PDS Geosciences Node
Washington University in St. Louis

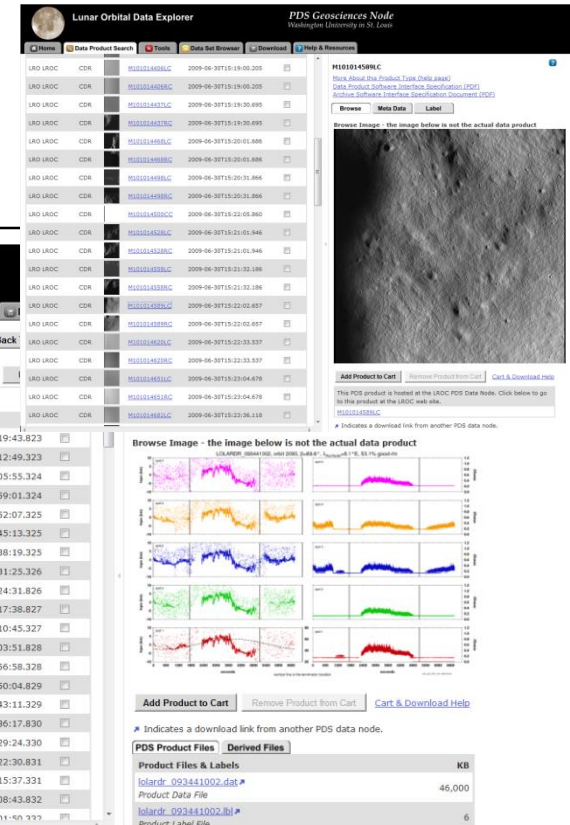
Home Data Product Search Tools Data Set Browser Download Help & Resources

SEARCH RESULTS

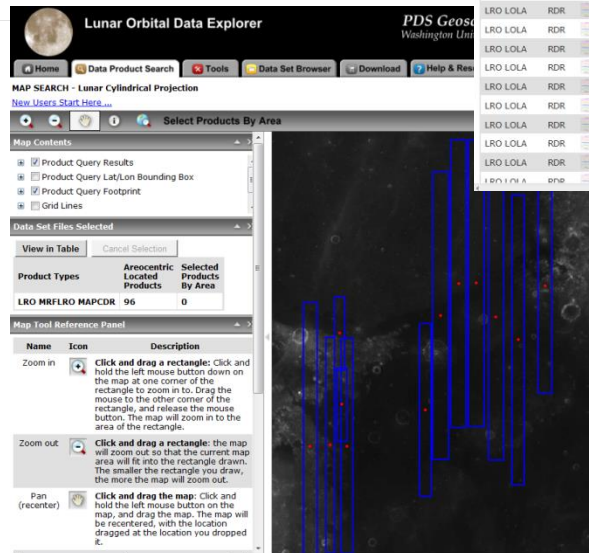
Products Found: 1,998
☒ Display Product Thumbnails

Instrument	Type	Product ID	Obs Time
LRO LOLA	RDR	LROLDR_093440423.DAT	2009-12-10T05:19:43.823
LRO LOLA	RDR	LROLDR_093440616.DAT	2009-12-10T07:12:49.323
LRO LOLA	RDR	LROLDR_093440809.DAT	2009-12-10T09:05:55.324
LRO LOLA	RDR	LROLDR_093441002.DAT	2009-12-10T10:59:01.324
LRO LOLA	RDR	LROLDR_093441155.DAT	2009-12-10T12:52:07.325
LRO LOLA	RDR	LROLDR_093441348.DAT	2009-12-10T14:45:13.325
LRO LOLA	RDR	LROLDR_093441541.DAT	2009-12-10T16:38:19.325
LRO LOLA	RDR	LROLDR_093441734.DAT	2009-12-10T18:31:25.326
LRO LOLA	RDR	LROLDR_093441927.DAT	2009-12-10T20:24:31.826
LRO LOLA	RDR	LROLDR_093442121.DAT	2009-12-10T22:17:38.827
LRO LOLA	RDR	LROLDR_093442314.DAT	2009-12-11T00:10:45.327
LRO LOLA	RDR	LROLDR_093450107.DAT	2009-12-11T02:03:51.828
LRO LOLA	RDR	LROLDR_093450300.DAT	2009-12-11T03:56:58.328
LRO LOLA	RDR	LROLDR_093450453.DAT	2009-12-11T05:50:04.829
LRO LOLA	RDR	LROLDR_093450646.DAT	2009-12-11T07:43:11.329
LRO LOLA	RDR	LROLDR_093450839.DAT	2009-12-11T09:36:17.830
LRO LOLA	RDR	LROLDR_093451032.DAT	2009-12-11T11:29:24.330
LRO LOLA	RDR	LROLDR_093451225.DAT	2009-12-11T13:22:30.831
LRO LOLA	RDR	LROLDR_093451419.DAT	2009-12-11T15:15:37.331
LRO LOLA	RDR	LROLDR_093451612.DAT	2009-12-11T17:08:43.832
LRO LOLA	RDR	LROLDR_093451805.DAT	2009-12-11T19:01:50.333

RETRIEVE and View Products



MAP Products



Lunar Orbital Data Explorer (ODE)

<http://ode.rsl.wustl.edu/moon/>

- ❑ Specialized PDS web tool
- ❑ Allows users to:
 - search, retrieve, and order PDS products
 - search across missions and instruments
 - search across PDS nodes
 - search via maps and forms
- ❑ Supports PDS-Compliant lunar archives from:
 - **Lunar Reconnaissance Orbiter (LRO)**
 - ❑ **DIVINER, Mini-RF, LAMP, LEND, LROC, LOLA**
 - ISRO Chandrayaan-1
 - ❑ Forerunner (Mini-RF), Moon Mineralogy Mapper
 - Clementine
 - Lunar Prospector
 - Lunar Orbiter
 - GRAIL

ODE Approach – Web Interface

- ❑ Dynamic forms-based **product** query including:
 - Instrument / Product Type
 - Space and Time
 - Cross-instrument searches
 - Product-specific searches
- ❑ Map-based query
- ❑ Browse versions of products
- ❑ Direct access to product-specific web interfaces
 - Example: LROC Team Site
- ❑ Download selected products in “on-the-fly mini-archives”

Example:

Find DIVINER Products in ODE

Open ODE Moon: <http://ode.rsl.wustl.edu/moon/>

The screenshot shows the Lunar Orbital Data Explorer (ODE) web application. The browser window has a single tab titled "Lunar Orbital Data Explorer - Ho...". The page header features a moon image, the title "Lunar Orbital Data Explorer", and the affiliation "PDS Geosciences Node Washington University in St. Louis". A navigation bar contains links: Home, Data Product Search, Tools, Data Set Browser, Download, and Help & Resources. Below the navigation bar, a welcome message reads: "WELCOME TO THE LUNAR ORBITAL DATA EXPLORER - WEB1. The PDS Geosciences Node Lunar Orbital Data Explorer (ODE) provides search, display, and download tools for the PDS science data archives of the Clementine and Lunar Prospector missions to Earth's moon (LRO and other lunar data sets will be added when released). Choose one of the above tabs to start using ODE." The main content area is a grid of eight boxes. The first column contains: "Data Product Search" (with a magnifying glass icon), "Additional Tools" (with a wrench icon), "Data Set Browser" (with a folder icon), and "Download Cart" (with a shopping cart icon). The second column contains: "What's New" (with a "THIS IS NEW!" badge), "Help & Resources" (with a question mark icon), "Available Data Sets" (with a calendar icon), and two buttons for "Mars ODE" and "Mercury ODE" (each with a planet icon).

Find DIVINER in ODE - Search

1) Select Data Product Search Tab

2) Open the Select One or More Desired Data Sets

Lunar Orbital Data Explorer - Dat... x (Untitled) x

Lunar Orbital Data Explorer PDS Geosciences Node
Washington University in St. Louis

[Home](#) **Data Product Search** [Tools](#) [Data Set Browser](#) [Download](#) [Help & Resources](#)

DATA PRODUCT SEARCH [Reset Form](#) ?

Planetary science data stored in PDS is organized by [data products](#) and [data sets](#). A data set is a collection of related data products, usually products acquired by a particular instrument and processed in a certain way. The data set also includes all documentation and supporting materials needed to understand and use the data products. A data product is a set of measurements resulting from a science observation, usually products acquired by a particular instrument and processed in a certain way.

STEP 1. SELECT DATA SETS TO SEARCH (A SELECTION IS REQUIRED) ?

☒ **Select One or More Desired Data Sets** (Show Options - 1 Parameter Set)

STEP 2. SET ADDITIONAL FILTERING PARAMETERS (OPTIONAL)

<input checked="" type="checkbox"/> Select a Product ID or filter by a partial Product ID	(Show Options - 0 Parameters Set)
<input checked="" type="checkbox"/> Find by Product Center Latitude / Longitude	(Show Options - 0 Parameters Set)
<input checked="" type="checkbox"/> Filter by Time Range	(Show Options - 2 Parameters Set)

STEP 3. PREVIEW SEARCH RESULTS SUMMARY (OPTIONAL)

[Preview Search Results Summary](#)

STEP 4. SUBMIT QUERY

[View Results in Table](#) [View Results on Map](#)

☒ Display Product Thumbnails on search results page

DIVINER and ODE – Search

Lunar Orbital Data Explorer
PDS Geosciences Node
Washington University in St. Louis

Home Data Product Search Map Search Tools Data Set Browser Download Help

DATA PRODUCT SEARCH [Reset Form](#)

Planetary science data stored in PDS is organized by [data products](#) and [data sets](#). A data set is a collection of related data products, usually products acquired by a particular instrument and processed in a certain way. The data set also includes all documentation and supporting materials needed to understand and use the data products. A data product is a set of measurements resulting from a science observation, usually products acquired by a particular instrument and processed in a certain way.

STEP 1. SELECT DATA SETS TO SEARCH (A SELECTION IS REQUIRED)

Select One or More Desired Data Sets (Released PDS Archives) (Hide Options - 1 Parameter Set)

- Map location data is available for these products.
- Observation time data is available for these products.
- This data set is currently being processed in ODE. [Click for more detail](#)

Lunar Reconnaissance Orbiter

DLRE - DIVINER Lunar Radiometer Experiment

<input type="checkbox"/>	RDR - Reduced Data Rec. (See Tools: DIVINER RDR Query Tool)	Data Set Description
<input type="checkbox"/>	GDR_L2 - Gridded Data Record Level 2	Data Set Description
<input checked="" type="checkbox"/>	GDR_L3 - Gridded Data Record Level 3	Data Set Description
<input type="checkbox"/>	PRP - Gridded Data Record Polar Resource Products	Data Set Description

Other Product Types

- Select:
 - RDRs
 - GDR_L2
 - GDR_L3
 - PRP

•EDRS are available under here

DIVINER and ODE - Search

OPTIONALLY:

1) Filter by:

- Product Id,
- Location,
and/or
- Time Range

FINALLY:

3) Select
“View Results in Table”

The screenshot shows the NASA Planetary Data System search interface. A red circle highlights the 'STEP 2. SET ADDITIONAL FILTERING PARAMETERS (OPTIONAL)' section, which includes a 'Product ID' field with the value '*avg_pols*', and checkboxes for 'Find by Product Location' and 'Filter by Time Range'. A red arrow points from the 'Filter by' list to this section. Another red arrow points from the 'View Results in Table' button in the 'STEP 4. SUBMIT QUERY' section to the text '18 - NASA Planetary Data Systems'.

STEP 2. SET ADDITIONAL FILTERING PARAMETERS (OPTIONAL)

☒ **Select a Product ID or filter by a partial Product ID** (Hide Options - 1 Parameter Set)

Each PDS data product has a unique [product id](#). Individual data products can be found with an exact match or multiple products can be found using the the wild card parameter. New users [click here](#) for further details.

Product ID: use wildcard * after or before a partial Product ID

☒ **Find by Product Location** (Show Options - 0 Parameters Set)

☒ **Filter by Time Range** (Show Options - 0 Parameters Set)

STEP 3. PREVIEW SEARCH RESULTS SUMMARY (OPTIONAL)

Product Type	Search Results Count
LRO DLRE GDR_L3	184
Total Products Found	184

STEP 4. SUBMIT QUERY

☒ **View Results in Table**

☒ **Display Product Thumbnails on search results page**

DIVINER and ODE – Product Details

Product Details

Features:

- Review browse, metadata, and label
- Download individual files
- Review documentation including SISs
- Add product to download cart

Lunar Orbital Data Explorer

PDS Geosciences Node
Washington University in St. Louis

[Home](#)
[Data Product Search](#)
[Map Search](#)
[Tools](#)
[Data Set Browser](#)
[Download](#)
[Help & Resources](#)

SEARCH RESULTS

Products Found: 1,360

☒ Display Product Thumbnails

[Update Cart](#)

Instrument	Type	Product ID	Obs Time	
LRO DLRE	GDR_L3	DGDR_TBOL_AVG_POLS_20110817N_240_IMG.IMG	2011-08-31T00:00:00.000	<input type="checkbox"/>
LRO DLRE	GDR_L3	DGDR_TBOL_AVG_POLS_20110817N_240_JP2.JP2	2011-08-31T00:00:00.000	<input type="checkbox"/>
LRO DLRE	GDR_L3	DGDR_TBOL_AVG_POLS_20110830D_240_IMG.IMG	2011-09-13T14:00:00.000	<input type="checkbox"/>
LRO DLRE	GDR_L3	DGDR_TBOL_AVG_POLS_20110830D_240_JP2.JP2	2011-09-13T14:00:00.000	<input checked="" type="checkbox"/> In Cart
LRO DLRE	GDR_L3	DGDR_TBOL_AVG_POLS_20110913N_240_IMG.IMG	2011-09-27T07:00:00.000	<input checked="" type="checkbox"/> In Cart
LRO DLRE	GDR_L3	DGDR_TBOL_AVG_POLS_20110913N_240_JP2.JP2	2011-09-27T07:00:00.000	<input checked="" type="checkbox"/> In Cart
LRO DLRE	GDR_L3	DGDR_TBOL_AVG_POLS_20110927D_240_IMG.IMG	2011-10-10T21:00:00.000	<input checked="" type="checkbox"/> In Cart
LRO DLRE	GDR_L3	DGDR_TBOL_AVG_POLS_20110927D_240_JP2.JP2	2011-10-10T21:00:00.000	<input checked="" type="checkbox"/> In Cart
LRO DLRE	GDR_L3	DGDR_TBOL_AVG_POLS_20111010N_240_IMG.IMG	2011-10-24T13:30:00.000	<input type="checkbox"/>
LRO DLRE	GDR_L3	DGDR_TBOL_AVG_POLS_20111010N_240_JP2.JP2	2011-10-24T13:30:00.000	<input type="checkbox"/>
LRO DLRE	GDR_L3	DGDR_TBOL_AVG_POLS_20111024D_240_IMG.IMG	2011-11-07T03:30:00.000	<input type="checkbox"/>
LRO DLRE	GDR_L3	DGDR_TBOL_AVG_POLS_20111024D_240_JP2.JP2	2011-11-07T03:30:00.000	<input type="checkbox"/>
LRO DLRE	GDR_L3	DGDR_TBOL_AVG_POLS_20111107N_240_IMG.IMG	2011-11-20T20:30:00.000	<input type="checkbox"/>
LRO DLRE	GDR_L3	DGDR_TBOL_AVG_POLS_20111107N_240_JP2.JP2	2011-11-20T20:30:00.000	<input type="checkbox"/>
LRO DLRE	GDR_L3	DGDR_TBOL_AVG_POLS_20111120D_240_IMG.IMG	2011-12-04T13:30:00.000	<input type="checkbox"/>
LRO DLRE	GDR_L3	DGDR_TBOL_AVG_POLS_20111120D_240_JP2.JP2	2011-12-04T13:30:00.000	<input type="checkbox"/>
LRO DLRE	GDR_L3	DGDR_TBOL_AVG_POLS_20111204N_240_IMG.IMG	2011-12-13T12:00:00.000	<input type="checkbox"/>
LRO DLRE	GDR_L3	DGDR_TBOL_AVG_POLS_20111204N_240_JP2.JP2	2011-12-13T12:00:00.000	<input type="checkbox"/>
LRO DLRE	GDR_L3	DGDR_TBOL_AVG_POLS_20111218D_240_IMG.IMG	2011-12-25T02:30:00.000	<input type="checkbox"/>

DGDR_TBOL_AVG_POLS_20110830D_240_JP2.JP2

Product Description: " Each sample represents the B ([more...](#))

[More About this Product Type \(help page\)](#)

[PDS Volume](#) [AAREADME.TXT](#) [ERRATA.TXT](#) [Catalog Files](#) [Document Files](#)

[Data Product Software Interface Specification \(PDF\)](#)

[Archive Software Interface Specification Document \(PDF\)](#)

[PDS Source Location](#)

[Browse](#)
[Meta Data](#)
[Label](#)
[Related Products](#)
[Map Context](#)

Browse Image - the image below is not the actual data product

[Add Product to Cart](#)
[Remove Product from Cart](#)
[Cart & Download Help](#)

PDS Product Files **Derived Files**

Product Files & Labels	KB
dadr_tbol_avg_pols_20110830d_240_ip2.jp2	15,524
Product Data File	
dadr_tbol_avg_pols_20110830d_240_ip2.lbl	4
Product Label File	

ODE – Map Interface

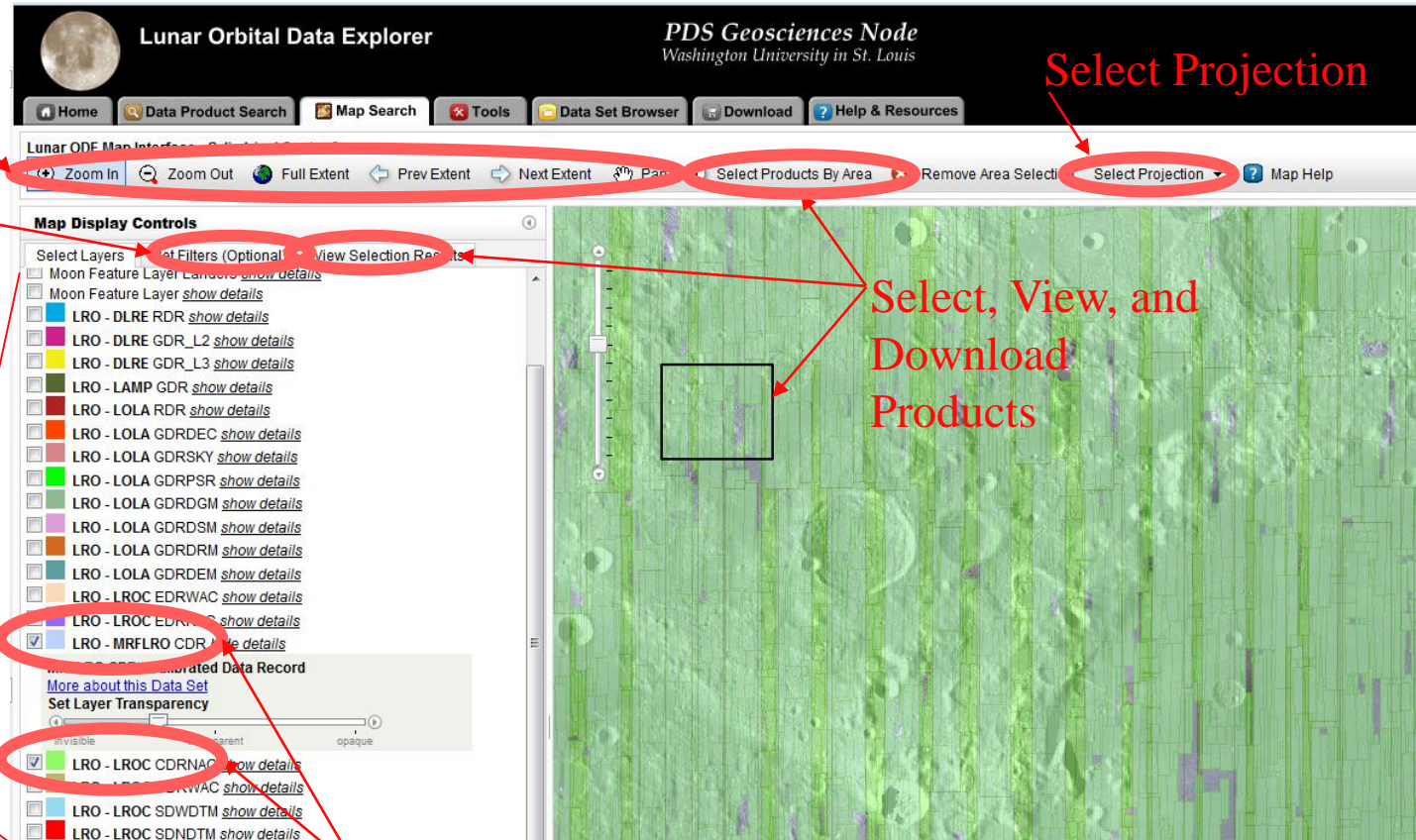
Zoom/Pan Map

Filter Products by

- Time
- Product Id
- Location

Control Map Layers

- Transparency
- Layer Order
- Coverage Layers
- Basemap Layers



Select Product Type Layers

ODE Query Tools for LRO Data

- ❑ Searchable Database of Science Data
- ❑ LOLA RDR Query Tool
 - Database of all RDR records
 - ~6.5B individual points
 - Query by feature, location, orbit, time, product id, altitude range, and channels
- ❑ DIVINER RDR Query Tool
 - Database of all RDR records
 - ~172B individual points
 - Query by feature, location, orbit, time, product id, channel, detector, emission angle, solar incidence angle, solar azimuth angle, local time of day, and quality flags

STEP 1. SELECT DATA POINT LATITUDE / LONGITUDE RANGE TO SEARCH (A SELECTION IS REQUIRED)

Select a Specific Feature

A selected feature's latitude and longitude bounding box will be used for search criteria.

Feature Type:

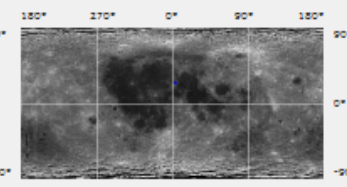
Feature Name:

OR

Directly specify a Latitude and Longitude coverage area

ODD uses [planetary coordinates](#) that are based on the product's center latitude and longitude.

Max Latitude
(-90 to 90)

Selected Search Area


Western most Longitude
(0 to 360)

Eastern most Longitude
(0 to 360)

Min Latitude
(-90 to 90)

Show Area On Map

STEP 2. SELECT CHANNEL(S) (A SELECTION IS REQUIRED)

The DIVINER instrument uses 9 channels to acquire data. Users should review the [DIVINER SRS SRS](#) for channel specifications. You may limit the channels of output data.

Desired Channels:

☐ Ch 1 (A1) 0.3 - 3.0 μ m (High sensitivity)
☒ Ch 7 (S1) 25 - 50 μ m

☐ Ch 2 (A2) 0.3 - 3.0 μ m
☒ Ch 8 (S2) 50 - 100 μ m

☐ Ch 3 (A3) 7.5 - 8.0 μ m
☒ Ch 9 (S3) 100 - 200 μ m

☐ Ch 4 (A4) 8.0 - 8.4 μ m

☐ Ch 5 (A5) 8.4 - 8.7 μ m

☐ Ch 6 (A6) 12.5 - 25 μ m

STEP 3. SET ADDITIONAL FILTERING PARAMETERS (OPTIONAL)

☒ Select a Product ID or Filter by a partial Product ID (Show Options - 0 Parameters Set)

☒ Filter by Orbit Number (Show Options - 2 Parameters Set)

☒ Filter by UTC Time (Show Options - 0 Parameters Set)

☒ Filter by Local Time of Day (Show Options - 0 Parameters Set)

☒ Filter by Detectors (Show Options - 21 Parameters Set)

☒ Filter by Emission, Solar Incidence, and Solar Azimuth Angles (Show Options - 0 Parameters Set)

☒ Filter by Quality Flags (Show Options - 0 Parameters Set)

STEP 4. PREVIEW RESULTS COUNT

Click the button below to see how many DIVINER RDR points match your selected criteria.

Points found: 157,651

Proceed to download results if you are satisfied with the point count.

STEP 5. REQUEST RESULTS

Note: Any change to the search criteria will clear the results and require a query. Please acquire generated files before changing criteria.

Output Options

☐ ASCII Format

☒ Shapefile Format

Binned Images (Radiance and Calibrated Brightness Temperature)

☒ Color (Global Range)

☒ Color (Local Range)

☒ Grayscale (Global)

Range:

Grayscale (Local Range)

Files

DIVINER_22_7n24_Sn_1_Sc4_Sc_C7_C8_C9_000_000 (1 MB)

DIVINER_22_7n24_Sn_1_Sc4_Sc_C7_C8_C9_000_000 (4 MB)

DIVINER_22_7n24_Sn_1_Sc4_Sc_C7_C8_C9_000_000 (54 MB)

DIVINER_22_7n24_Sn_1_Sc4_Sc_C7_C8_C9_000_000 (157 B)

DIVINER_22_7n24_Sn_1_Sc4_Sc_C7_C8_C9_000_000 (1 KB)

DIVINER_22_7n24_Sn_1_Sc4_Sc_C7_C8_C9_000_000 (10 KB)

DIVINER_22_7n24_Sn_1_Sc4_Sc_C7_C8_C9_000_000 (4 KB)

DIVINER_22_7n24_Sn_1_Sc4_Sc_C7_C8_C9_000_000 (133 KB)

DIVINER_22_7n24_Sn_1_Sc4_Sc_C7_C8_C9_000_000 (2 KB)

DIVINER_22_7n24_Sn_1_Sc4_Sc_C7_C8_C9_000_000 (888 KB)

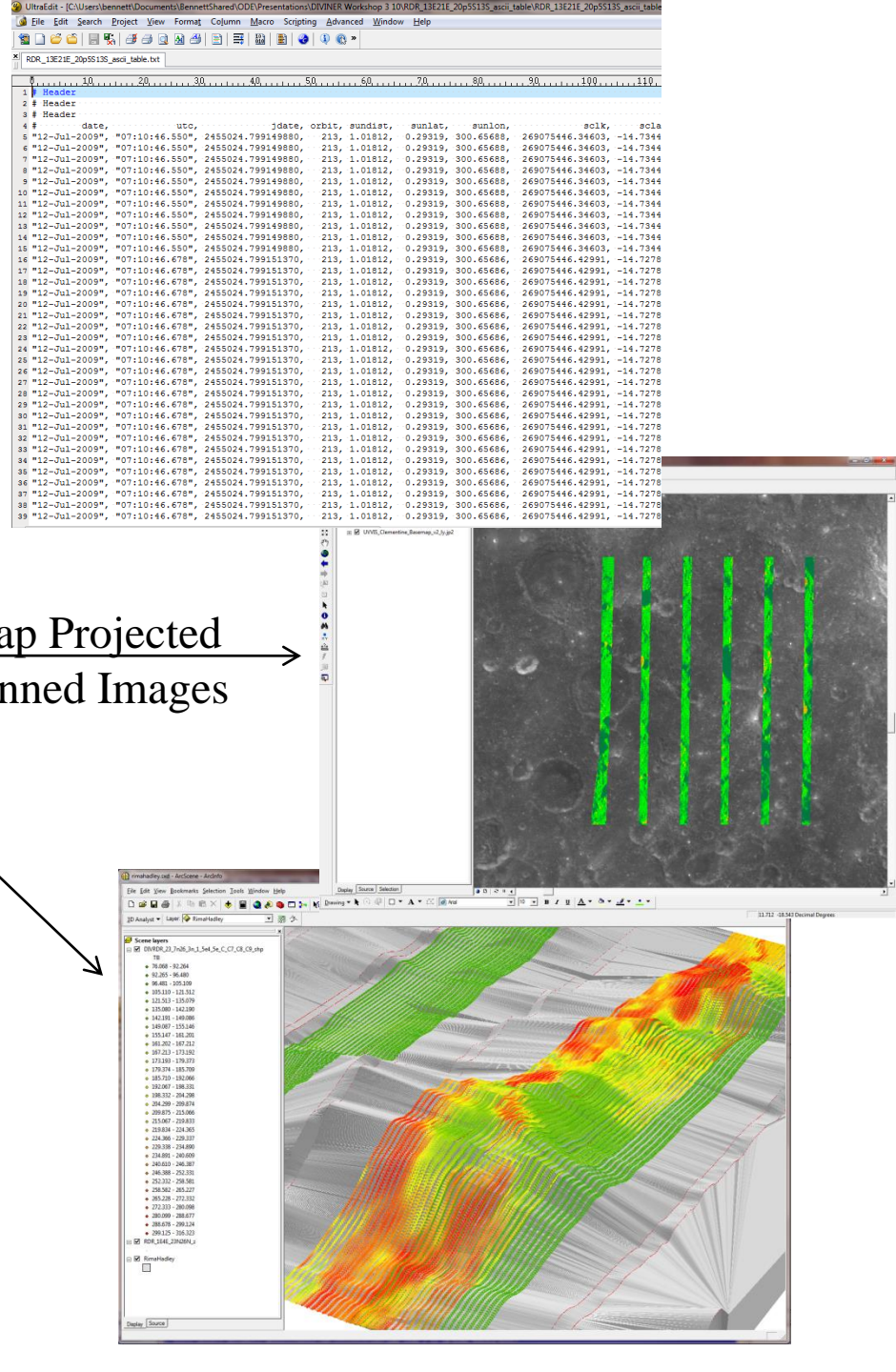
Additional files are available through grouped formats.

Grouped Files - Download Format

ASCII
Tables

Map Projected
Binned Images

Shapefiles



LOLA and LROC PDS Data Nodes

LOLA/LRORS PDS Data Node

Lunar Orbiter Laser Altimeter

Lunar Reconnaissance Orbiter Radio Science

Lunar Reconnaissance Orbiter Camera

Home What is LROC Images Downloads Outreach Tours

Quick Links:

- News & Announcements
- Images
- Targeting Tool
- Where is LRO?
- Who We Are
- Apollo Moon Rock
- Apollo Scan Project

Featured Image (Mar. 6th, 2014)



Mission Elapsed Time (MET)
1725 : 18 : 16 : 58
Days Hrs Mins Secs

Caption: The square corner along the north is evidence of pre-impact fracturing. LROC N image width is ~7 km (~4.4 miles) [NASA/GSFC/University]. — Continue reading... »

Recent Announcements & News

14 Dec **LROC 16th PDS Release**

The 16th LROC Planetary Data System acquired between 2013-06-16 to 2013-12-15 contains 69,168 EDR images - totaling 7 images - totaling 16 TB. An additional Models (DTM) and 7 NAC Region Of were also released as part of this LROC total of 171 NAC DTMs and 100 NAC R data.

» Continue reading "LROC 16th PDS"

Posted by Ernest Bowman-Cisneros in 09:59

Feature

Apollo Sample 15555
Check out LROC's Moon rock!
Learn more here!

NASA Lunar Reconnaissance Orbiter

Space Exploration Resources

AD PLANET

Comments and suggestions can be emailed to

Lunar Reconnaissance Orbiter Camera

Home What is LROC Images Downloads Outreach Tours

WMS Browser Thumbnail Browser Image Search RDR Products

Map Options

Cursor Latitude: 13.097
Cursor Longitude: -22.826

Projection: Orthographic

Center Latitude: 0
Center Longitude: 0
Recenter & Reproject


Single-click action

- ☐ None (double-click to zoom)
- ☐ Recenter
- ☐ Recenter & Zoom
- ☐ Get Footprint Info

Permalink

Overview

Click the overview to recenter



Layers

- (-) Base layer
- (-) Regional Products
- (-) Instrument Observation Footprints
 - (-) LROC NAC
 - ☐ No NAC footprints
 - ☐ All NAC footprints
 - ☐ Commissioning (2009/06/18 - 2009/09/15)
 - ☐ ESMD (2009/09/15 - 2010/09/16)
 - ☐ OSMD (2010/09/16 - 2012/09/13)
 - ☐ ESM (2012/09/16 - 7)
 - (-) LROC WAC
 - (-) Apollo metric camera
 - (-) Miscellaneous
 - (-) Grids

Questions? Demos?

- Visit us at the PDS Geosciences Booth
 - Get detailed answers
 - See live demos
- Contacts:
 - Keith Bennett
 - bennett@wustl.edu